METHOD AND APPARATUS FOR CALCULATING GEOMETRY
OF A MOVING HAVEN

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention pertains to the field of marine navigation and more particularly to the calculation of the geometry of a moving haven along a navigation path.
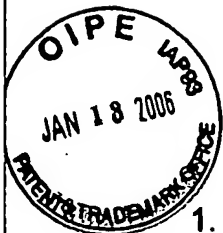
2. Description of the Prior Art

5   A moving haven is a mechanism used in marine navigation to manage the voyages of marine vessels. A moving haven is generally a three-dimensional region which moves along a predefined path, a voyage plan. A vessel using a moving haven for navigation may move freely within the region, but may not go outside its boundaries.

10   The calculation of the geometry of the moving haven presents some difficult challenges due to the subtle variations of its shape for small changes in the parameters that define it. Prior solutions focused on drawing the moving haven in its more common manifestations and required special case logic to handle variations from the norm. Special case logic makes software more complicated, and it is

15   difficult to make complex software work correctly. Furthermore, it is difficult to identify all the special cases, so some are inevitably missed.

A moving haven is a two dimensional region that moves through the ocean. A ship may not cross outside the moving haven boundary, but is allowed to operate within it freely.

20   A moving haven, in its simplest manifestation, is a rectangle. As it progresses through the water, it follows a predefined path, which is called a voyage plan, defined by a series of waypoints connected by legs. A rectangular buffer, the sides of which are a predetermined distance from the corresponding sides of the rectangle, provides an early warning to the navigator that the ship is approaching the edge of

25   the moving haven.